

Amendments to the Claims

This listing of the Claims will replace all prior versions and listings of the claims in this patent application.

Listing of the Claims

1-10. (canceled)

11. (currently amended) A method of forming an electronic package comprising the steps of:

separating a wafer into multiple dies;

after said separating said wafer, joining ~~at least one of said dies and a substrate,~~
wherein an ~~multiple~~ openings are formed in said substrate and exposes ~~said at least one of~~
said dies;

depositing a ~~multiple~~ solder balls into said openings; and

after said joining said ~~at least one of said dies and said substrate,~~ separating said
substrate into multiple portions.

12. (currently amended) The method of claim 11, further comprising depositing a UBM layer over a ~~multiple~~ pads ~~formed over an active surface of said wafer,~~ followed by said separating said wafer, followed by said joining said ~~at least one of said dies and said~~

substrate, wherein said opening in said substrate exposes said UBM layer. ~~said UBM layer exposed by said openings in said substrate.~~

13. (currently amended) The method of claim 11, wherein said openings ~~are~~ is formed in said substrate before said joining said ~~at least one of said dies and said substrate.~~

14. (canceled)

15. (currently amended) The method of claim 11, wherein said ~~at least one of said dies~~ comprises ~~a multiple pads~~ and a passivation layer ~~formed over an active surface thereof,~~ an opening in said passivation layer exposing said pads, and wherein said opening in said substrate exposes said pad. ~~exposed by said openings in said substrate and exposed by multiple openings in said passivation layer.~~

16. (canceled)

17. (currently amended) The method of claim 11, wherein said ~~at least one of said dies~~ comprises ~~a multiple-first pads, a multiple-second pads~~ and a passivation layer ~~formed over an active surface thereof,~~ an opening in said passivation layer exposing said second pad, said first pad over said passivation layer and connected to said second pad, the position of said first pad from a top view being different from that of said second pad, and wherein said opening in said substrate exposes said first pad. ~~said first pads exposed by said openings in said substrate, said first pads deposited over said passivation layer,~~

~~multiple openings formed in said passivation layer and exposing said second pads, said first pads electrically connected to said second pads, and said first pads having a layout different from that of said second pads.~~

18. (canceled)

19. (currently amended) The method of claim 11 further comprising depositing ~~forming~~ an adhesive material over said substrate, followed by said joining said ~~at least one of said~~ dies and said substrate using said adhesive material.

20. (currently amended) The method of claim 11, after said joining said ~~at least one of~~ said dies and said substrate, further comprising depositing ~~forming~~ a polymer layer encapsulating said ~~at least one of said~~ dies.

21-22. (canceled)

23. (previously amended) The method of claim 11, wherein said substrate comprises bismaleimide triazine (BT).

24. (currently amended) The method of claim 11, wherein said solder balls comprises tin-silver alloy.

25. (currently amended) The method of claim 11, wherein said openings is ~~are~~ formed using a process comprising mechanical drilling or laser drilling.

26-41. (canceled)

42. (currently amended) A method of forming an electronic package comprising the steps of:

depositing an adhesive material over a substrate; and

~~after said depositing said adhesive layer, joining at least a die and said substrate using said adhesive layer, wherein an multiple openings are formed in said substrate and exposes said die; and,~~

after said joining said die and said substrate, separating said substrate into multiple portions.

43. (currently amended) The method of claim 42, wherein said die comprises a UBM layer and a pad, said UBM layer being over said pad, and wherein said opening exposes said UBM layer. ~~exposed by said openings.~~

44. (currently amended) The method of claim 42, wherein said die comprises a pad and a passivation layer, an opening in said passivation layer exposing said pad, and wherein said openings in said substrate exposes said multiple pads. ~~exposed by multiple openings in a passivation layer formed over an active surface of said die.~~

45. (currently amended) The method of claim 42, wherein said die comprises a first pad, a second pad and a passivation layer, an opening in said passivation layer exposing said second pad, said first pad over said passivation layer and connected to said second pad, the position of said first pad from a top view being different from that of said second pad, and wherein said opening in said substrate exposes said first pad. ~~wherein said openings in said substrate expose multiple first pads deposited over a passivation layer formed over an active surface of said die, wherein multiple openings are formed in said passivation layer and expose multiple second pads formed over said active surface of said die, said first pads electrically connected to said second pads, and said first pads having a layout different from that of said second pads.~~

46. (currently amended) The method of claim 42, after said joining said die and said substrate, further comprising depositing ~~forming~~ a polymer layer encapsulating said die.

47. (currently amended) The method of claim 42, wherein said substrate has a thickness of between 150 and 300 microns. ~~after said joining said die and said substrate, further comprising separating said substrate.~~

48. (currently amended) The method of claim 42, wherein said openings is ~~are~~ formed in said substrate before said joining said die and said substrate.

49. (previously amended) The method of claim 42, wherein said substrate comprises bismaleimide triazine (BT).

50. (currently amended) The method of claim 42, after said joining said die and said substrate, further comprising depositing a conductive material into said opening_s.

51. (currently amended) The method of claim_50, wherein said conductive material comprises ~~multiple-solder_ balls.~~

52. (currently amended) A method of forming an electronic package comprising the steps of:

providing ~~at least a die comprising a UBM layer~~ and a first pad, said UBM layer being over said first pad; and

joining said die and a substrate, wherein ~~an multiple-openings are formed in said substrate and exposes~~ said UBM layer.

53. (currently amended) The method of claim 52, after said joining said die and said substrate, further comprising depositing a conductive material into said opening_s.

54. (currently amended) The method of claim 53, wherein said conductive material comprises ~~multiple-solder_ balls.~~

55. (currently amended) The method of claim 52, wherein said die comprises a passivation layer, an opening in said passivation layer exposing said first pad, multiple pads exposed by multiple openings in a passivation layer formed over an active surface of said die, said UBM layer formed over said pads.

56. (currently amended) The method of claim 52, wherein said die comprises a second pad and a passivation layer, an opening in said passivation layer exposing said second pad, said first pad over said passivation layer and connected to said second pad, the position of said first pad from a top view being different from that of said second pad, a passivation layer and a metal layer formed over an active surface thereof, said metal layer deposited over said passivation layer, said UBM layer deposited over said metal layer.

57. (currently amended) The method of claim 52, after said joining said die and said substrate, further comprising separating said substrate into multiple portions.

58. (currently amended) The method of claim 52, after said joining said die and said substrate, further comprising depositing forming a polymer layer encapsulating said die.

59. (canceled)

60. (previously presented) The method of claim 52 further comprising depositing an adhesive material over said substrate, followed by said joining said die and said substrate using said adhesive material.

61. (currently amended) The method of claim 52, wherein said openings ~~is~~ are formed in said substrate before said joining said die and said substrate.

62. (currently amended) The method of claim 52, wherein said UBM layer comprises copper, ~~or nickel.~~

63. (currently amended) A method of forming an electronic package comprising the steps of:

joining ~~at least a die and a substrate, wherein an multiple openings are formed in~~ said substrate ~~and exposes~~ a topmost patterned circuit layer of said die; and

depositing a conductive material into said openings, wherein said conductive material is used to connect ~~suited for connecting said topmost patterned circuit layer said die to an external circuitry.~~

64. (currently amended) The method of claim 63, wherein said conductive material comprises ~~multiple solder balls.~~

65. (currently amended) The method of claim 63, wherein said conductive material comprises tin-lead alloy, ~~or tin-silver alloy.~~

66. (previously presented) The method of claim 63, wherein said external circuitry comprises a next level of packaging.

67. (currently amended) The method of claim 63, wherein said topmost patterned circuit layer die comprises a UBM layer and ~~multiple a pads, formed over an active surface thereof,~~ said UBM layer being formed over said pads, and wherein said opening in said substrate exposes said UBM layer, ~~exposed by said openings in said substrate.~~

68. (currently amended) The method of claim 63, wherein said die comprises a passivation layer, an opening in said passivation layer exposing a pad of said topmost patterned circuit layer, and wherein said opening in said substrate exposes said pad. ~~multiple pads exposed by said openings in said substrate and exposed by multiple openings in a passivation layer formed over an active surface of said die.~~

69. (currently amended) The method of claim 63, wherein said die comprises a first pad and a passivation layer, an opening in said passivation layer exposing said first pad, and wherein said topmost patterned circuit layer comprises a second pad over said passivation layer and connected to said first pad, the position of said first pad from a top view being different from that of said second pad, and wherein said opening in said substrate exposes said second pad. ~~multiple pads, a passivation layer and a metal layer formed over an active surface thereof, said passivation layer exposing said pads, said metal layer deposited over said passivation layer and electrically connected to said pads, said openings exposing said metal layer.~~

70. (currently amended) The method of claim 63, after said depositing said conductive material, further comprising separating said substrate into multiple portions.

71. (currently amended) The method of claim 63, after said joining said die and said substrate, further comprising depositing ~~forming~~ a polymer layer encapsulating said die.

72. (canceled)

73. (currently amended) The method of claim 63, further comprising depositing ~~forming~~ an adhesive material over said substrate, followed by said joining said die and said substrate using said adhesive material.

74. (currently amended) The method of claim 63, wherein said openings is ~~are~~ formed in said substrate before said joining said die and said substrate.

75-101. (Canceled)

102. (currently amended) A method of forming an electronic package comprising the steps of:

depositing a UBM layer over a first pad of a wafer;

separating said wafer into multiple dies;

joining ~~at least one of~~ said dies and a substrate, wherein an ~~multiple~~ openings are ~~formed in said substrate and exposes~~ said UBM layer; and

depositing a conductive material into said opening. ~~over said UBM layer exposed by said openings.~~

103. (currently amended) The method of claim 102, wherein said conductive material comprises ~~at least a solder ball.~~

104. (currently amended) The method of claim 102, wherein said wafer comprises a passivation layer, an opening in said passivation layer exposing said first pad. ~~said UBM layer is deposited over multiple pads exposed by multiple openings in a passivation layer formed over an active surface of said wafer.~~

105. (currently amended) The method of claim 102, wherein said wafer comprises a second pad and a passivation layer, an opening in said passivation layer exposing said second pad, said first pad over said passivation layer and connected to said second pad, the position of said first pad from a top view being different from that of said second pad. ~~multiple pads, a passivation layer and a metal layer formed over an active surface thereof, said passivation layer exposing said pads, said metal layer deposited over said passivation layer and electrically connected to said pads, said UBM layer deposited over said metal layer.~~

106. (currently amended) The method of claim 102, after said depositing said conductive material, further comprising separating said substrate into multiple portions.

107. (currently amended) The method of claim 102, after said joining ~~said at least one of~~ said dies and said substrate, further comprising depositing ~~forming~~ a polymer layer encapsulating ~~said at least one of~~ said dies.

108. (Canceled)

109. (currently amended) The method of claim 102, further comprising depositing ~~forming~~ an adhesive material over said substrate, followed by said joining ~~said at least one of~~ said dies and said substrate using said adhesive material.

110. (currently amended) The method of claim 102, wherein said opening is formed in said substrate before said joining ~~said at least one of~~ said dies and said substrate.

111. (currently amended) The method of claim 102, wherein said UBM layer comprises copper, ~~or nickel~~.

112-116. (Canceled)

117. (currently amended) A method of forming an electronic package comprising the steps of:

providing a die comprising a passivation layer and a metal layer, said metal layer being formed ~~over~~ said passivation layer; and

joining said die and a substrate, wherein ~~an multiple openings are formed in said~~
substrate ~~and exposes~~ said metal layer.

118. (currently amended) The method of claim 117, wherein said openings is ~~are~~ formed
in said substrate before said joining ~~at least one of said dies and said substrate.~~

119. (currently amended) The method of claim 117, wherein said metal layer comprises a
UBM layer, ~~exposed by said openings.~~

120. (currently amended) The method of claim 119, wherein said UBM layer comprises
copper, ~~or nickel.~~

121. (currently amended) The method of claim 117, after said joining said die and said
substrate, further comprising depositing ~~forming~~ a polymer layer encapsulating said die.

122. (Canceled)

123. (currently amended) The method of claim 117, further comprising depositing
~~forming~~ an adhesive material over said substrate, followed by said joining said die and
said substrate using said adhesive material.

124. (currently amended) The method of claim 117, after said joining said die and said
substrate, further comprising depositing a conductive material into said openings.

125. (currently amended) The method of claim 124, wherein said conductive material comprises ~~multiple solder balls~~.

126. (currently amended) The method of claim 117, wherein said die further comprises ~~multiple a pads~~ exposed by an ~~multiple~~ openings in said passivation layer, said metal layer ~~electrically connected to said pads~~.

127. (currently amended) A method of forming an electronic package comprising the steps of:

providing a die comprising a ~~multiple~~ pads and a passivation layer, an ~~multiple~~ openings ~~formed in said passivation layer and exposing said pads~~; and

joining said die and a substrate, an ~~multiple~~ openings ~~formed in said substrate and exposing said pad~~s.

128. (currently amended) The method of claim 127, wherein said openings is ~~are~~ formed in said substrate before said joining said die and said substrate.

129. (currently amended) The method of claim 127, after said joining said die and said substrate, further comprising depositing ~~forming~~ a polymer layer encapsulating said die.

130. (Canceled)

131. (currently amended) The method of claim 127, further comprising depositing ~~forming~~ an adhesive material over said substrate, followed by said joining said die and said substrate using said adhesive material.

132. (previously presented) The method of claim 127, after said joining said die and said substrate, further comprising depositing a conductive material into said openings.

133. (currently amended) The method of claim 132, wherein said conductive material comprises ~~multiple solder balls~~.

134. (currently amended) A method of forming an electronic package comprising the steps of:

separating a wafer into multiple dies;

after said separating said wafer, joining ~~at least one~~ of said dies and a substrate, ~~wherein an multiple openings are formed in said substrate~~ exposing and ~~expose~~ said at least one of said dies; and

after said joining said ~~at least one~~ of said dies and said substrate, separating said substrate into multiple portions.

135. (currently amended) The method of claim 134, further comprising depositing a UBM layer over a pad of said wafer, ~~multiple pads formed over an active surface of said wafer~~, followed by said separating said wafer, followed by said joining said ~~at least one~~

of said dies and said substrate, wherein said opening exposes said UBM layer, exposed by said openings in said substrate.

136. (currently amended) The method of claim 134, wherein said openings is are formed in said substrate before said joining said at least one of said dies and said substrate.

137. (currently amended) The method of claim 134, wherein said at least one of said dies comprises a multiple pads and a passivation layer, an opening in said passivation layer exposing said pad, and wherein said opening in said substrate exposes said pad, formed over an active surface thereof, said pads exposed by said openings in said substrate and exposed by multiple openings in said passivation layer.

138. (currently amended) The method of claim 134, wherein said at least one of said dies comprises a first pad, a second pad and a passivation layer, an opening in said passivation layer exposing said second pad, said first pad over said passivation layer and connected to said second pad, the position of said first pad from a top view being different from that of said second pad, and wherein said opening in said substrate exposes said first pad.
~~multiple first pads, multiple second pads and a passivation layer formed over an active surface thereof, said first pads exposed by said openings in said substrate, said first pads deposited over said passivation layer, multiple openings formed in said passivation layer and exposing said second pads, said first pads electrically connected to said second pads, and said first pads having a layout different from that of said second pads.~~

139. (currently amended) The method of claim 134, further comprising depositing ~~forming~~ an adhesive material over said substrate, followed by said joining said ~~at least~~ one of said dies and said substrate using said adhesive material.

140. (currently amended) The method of claim 134, after said joining said ~~at least one of~~ said dies and said substrate, further comprising depositing ~~forming~~ a polymer layer encapsulating said ~~at least one of~~ said dies.

141. (currently amended) The method of claim 134, wherein said substrate has a thickness of between 150 and 300 microns. ~~further comprising forming an adhesive material over said wafer, followed by said separating said wafer, followed by said joining said at least one of said dies and said substrate using said adhesive material.~~

142. (Canceled)

143. (previously added) The method of claim 134, wherein said substrate comprises bismaleimide triazine (BT).

144. (currently amended) The method of claim 134, after said joining said ~~at least one of~~ said dies and said substrate, further comprising depositing a conductive material into said openings.

145. (currently amended) The method of claim 134, wherein said openings is ~~are~~ formed using a process comprising mechanical drilling or laser drilling.